

IN THE CLAIMS

Please amend the claims as follows:

1-2. (Cancelled).

3. (Currently Amended) ~~Method according to claim 2A~~ method for reducing the number of bits of a digital input signal, said method comprising the steps of:

_____ adding a pseudo-random noise signal to the digital input
5 signal to form an intermediate signal, the pseudo-random noise
signal being defined by noise parameters; and
_____ quantizing the intermediate signal having a word length of
n bits to a reduced word-length signal having a word length of m
bits, where n and m are integers, n being larger than or equal to
10 m, the quantizing of the intermediate signal including a first
transfer function which is non-linear, the first transfer function
being defined by non-linear device parameters, a quantization step
of the first transfer function for small amplitudes being smaller
than a quantization step for large amplitudes, in which
15 wherein the gain of the first transfer function is substantially
equal to one for small amplitudes, and in which wherein the gain
decreases for large amplitudes.

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4. (Currently Amended) ~~Method according to~~ The method as claimed in claim 3, in which wherein the first transfer function equals the function:

$$M_e/D_i = c_1 \tanh(c_2 D_i + c_3),$$

5 in which M_e is the reduced ~~word~~ word-length signal, D_i is the intermediate signal, and c_1 , c_2 , c_3 are the non-linear device parameters ~~(NLD_p)~~.

5. (Currently Amended) ~~Method according to~~ The method as claimed in claim 13, in which wherein the amplitude of the noise signal ~~(N_a)~~ is at least equal to a predetermined noise value.

6. (Cancelled).

7. (Currently Amended) ~~Method according to claim 1A~~ a method for reducing the number of bits of a digital input signal, said method comprising the steps of:

5 adding a pseudo-random noise signal to the digital input signal to form an intermediate signal, the pseudo-random noise signal being defined by noise parameters; and
quantizing the intermediate signal having a word length of n bits to a reduced word-length signal having a word length of m bits, where n and m are integers, n being larger than or equal to

10 m, the quantizing of the intermediate signal including a first
transfer function which is non-linear, the first transfer function
being defined by non-linear device parameters, in which~~wherein~~said
method further comprises the step of:

_____ recording the reduced word-word-length signal $\{M_e\}$, the
15 non-linear device parameters $\{NLD_p\}$ and/or~~and~~ the noise parameters
 $\{N_p\}$ are recorded on a recording medium $\{13\}$.

8. (Currently Amended) ~~Method according to~~ The method as
claimed in claim 7, in which the recording medium $\{13\}$ is a compact
disc and the reduced word-word-length signal $\{M_e\}$ is recorded on a
first channel, and the non-linear device parameters $\{NLD_p\}$
5 and/or~~and~~ the noise parameters $\{N_p\}$ are recorded on a second
channel, the first channel and second channel being separate
channels.

9. (Currently Amended) ~~Method according to claim 1A~~ a method for
reducing the number of bits of a digital input signal, said method
comprising the steps of:
_____ adding a pseudo-random noise signal to the digital input
5 signal to form an intermediate signal, the pseudo-random noise
signal being defined by noise parameters; and

quantizing the intermediate signal having a word length of
n bits to a reduced word-length signal having a word length of m
bits, where n and m are integers, n being larger than or equal to
10 m, the quantizing of the intermediate signal including a first
transfer function which is non-linear, the first transfer function
being defined by non-linear device parameters, ~~comprising the~~
further
wherein said method further comprises the steps of ~~providing:~~
15 ~~_____ forming a difference signal, the difference signal being~~
~~equal to the intermediate signal $\{D_i\}$ minus the reduced word-length~~
~~length signal $\{M_e\}$; and~~
~~_____ recording the difference signal, the non-linear device~~
~~parameters and the noise parameters on a recording medium.~~

10-11. (Cancelled).

12. Currently Amended) ~~Signal-~~ A signal processing apparatus,
comprising:

_____ a pseudo-random noise generator ~~(12)~~ for generating a
noise signal ~~$\{N_a\}$ being defined by noise parameters,~~ ~~i~~

5 _____ an addition element ~~(11)~~ connected to the pseudo-random
noise generator ~~(12)~~ for adding the noise signal ~~$\{N_a\}$ to an a~~

digital input signal ~~(M_i)~~ to provide thereby forming an intermediate signal ~~(D_i)~~, and

_____ a first ~~quantising~~ quantizing element ~~(10)~~ connected to
10 the addition element for transforming the intermediate signal ~~(D_i)~~,
having a word length of n bits into a reduced ~~word~~ word-length
signal having a word length of m bits, n and m being integers and n
being larger than or equal to m, wherein,

the ~~quantising~~ quantizing element ~~(10)~~ has a non-linear
15 transfer function, the non-linear transfer function being defined
by non-linear device parameters ~~(NLDp)~~, and wherein

_____ a quantization step of the non-linear transfer function
for small amplitudes being smaller than a quantization step for
large amplitudes, the gain of the non-linear transfer function
20 being substantially equal to one for small amplitudes, and the gain
decreasing for large amplitudes.

13. (Cancelled).

14. (Cancelled).

15. (Currently Amended) ~~Signal~~ A signal decoding apparatus
~~according to claim 14~~ for recovering an output signal from a reduced
word-length signal recorded on a record carrier, said record
carrier also having recorded thereon non-linear device parameters

5 and noise parameters used to generate the reduced word-length
signal from an input signal, said signal decoding apparatus
comprises:

_____ means for extracting the reduced word-length signal, the
non-linear device parameters and the noise parameters from the
10 record carrier;

_____ a quantization element coupled to said extracting means
for processing said reduced word-length signal using a non-linear
transfer function to form a decoded signal, said quantization
element having a control input for receiving said non-linear device
15 parameters for adjusting said non-linear transfer function to be
inverse to a non-linear transfer function used to form said reduced
word-length signal; ~~further comprising~~

_____ a ~~second~~ noise source (16) for providing a subtraction
noise signal (N_s) to a subtraction element (15);, said noise source
20 having a control input for receiving said noise parameters for
adjusting the subtraction noise signal (N_s) ~~being~~to substantially
equal to the a noise signal (N_a) used in forming said reduced word-
length signal; and, the

_____ a subtraction element (15) ~~being~~ arranged for subtracting
25 the subtraction noise signal (N_s) from the decoded signal (M_d) in
order to provide form the output signal, whereby the output signal
corresponds to the input signal.

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16. (Currently Amended) ~~Signal~~ A signal processing apparatus,
comprising:

means for adding a pseudo-random noise signal to ~~the a~~
digital input signal ~~(M_i)~~ to obtain an intermediate signal, the
5 pseudo-random noise signal being defined by noise parameters; and

means for ~~quantising~~ quantizing the intermediate signal,
having a word length of n bits, to a reduced ~~word~~ word-length
signal having a word length of m bits, n and m being integers and n
being larger than or equal to m , wherein

10 the ~~quantising~~ quantizing means includes a first transfer
function which is non-linear, the first transfer function being
defined by non-linear device parameters, and wherein

a quantization step of the first transfer function for
small amplitudes being smaller than a quantization step for large
15 amplitudes, the gain of the first transfer function being
substantially equal to one for small amplitudes, and wherein the
gain decreases for large amplitudes.

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